

BOWLING BALL RETRIEVING DEVICE

Cross - references to Related Applications : None

**Statement as to right to inventions made under Federally sponsored
research and development : Not Applicable.**

Background of the invention:

The field of the invention is generally that of a positive contact bowling ball return device and more specifically to a convexo-concave ball retrieving apparatus so fabricated as to capture, guide, lift and deposit in one smooth continuous flowing motion, a bowling ball for subsequent discharge into a bowling ball return. In the bowling industry there are certain mechanical malfunctions directly associated with the operation of automatic bowling machinery, these problems are most commonly referred to as spinners, Yo-yos and lane stoppages. It is these machinery malfunctions that constitute a meaningful overhead cost to the industry, these unnecessary problems result in a loss of revenue due to equipment downtime, bowler inconvenience, frustration, loss of customer satisfaction and the added cost for providing the personnel whose time would be better spent for other maintenance.

In reference to the Brunswick automatic pinsetter bowling machine, in particular models A and A2 which constitute a major percent of the bowling market, the bowling ball automatically finds its way for deposit onto the ball return wheel. It is at this time that the malfunction called spinning occurs. When the large static mass of a round bowling ball, excess oil on the ball and a lack of friction meet a continuously moving ball return wheel, moving at approximately 36 R.P.M. the bowling ball will take the path of least resistance and just sit there and spin. It is this same lack of friction that causes the ball to yo-yo or malfunction in another location of the ball return path. The environment inherent to the operation of automatic bowling equipment is naturally oily, dirty and subject to electrostatics which act in concert to attract even more dirt, it is this oil and dirt that introduces slippage and drag and acts as a deterrent to maintaining a constant friction for a smooth, efficient, trouble free and timely bowling ball return. It will be appreciated by those skilled in the art that to insure that a large mass bowling ball will be return routed, through automatic machinery without slippage or drag, requires a precise amount of applied friction.

1 It is an observation of this inventor that it has been indeed difficult, for manufactures,
2 to achieve and maintain this correct amount of friction due to the constantly changing
3 machine environment of oil and natural wear and the large mass of the ball. Prior art
4 has superficially approached this problem of friction, mass and the phenomena of spin by
5 applying three thin strips of carpet or belting material to the ball return wheel, held in
6 place by adhesives and by increasing the r.p.m. of the automatic machinery. Application of
7 this disposable ball kicker, by prior art, provides inadequate and only temporary friction
8 as the tape very quickly again becomes saturated with oil creating a potential fire hazard,
9 becomes ineffective and must be continuously disposed of in land fills. Typical costs to the
10 operators for three eighteen inch strips of tape per machine, in a fifty-lane bowling alley,
11 could be in excess of two hundred dollars per month and than must be replaced.

12 It will be appreciated by those skilled in the art that this one piece stand alone ball
13 retriever device, having no moving parts, that captures, guides, lifts and deposits in one
14 continuous flowing motion eliminates the need for disposable ball kickers and other ball
15 return aids having moving parts.

16 It will be further appreciated by those skilled in the art that this one piece positive
17 contact device will no longer require the higher machine speed of 36 R.P.M., it can now
18 be operated at approximately 1/3 the R.P.M. thereby reducing the ball wheel revolutions,
19 excessive wear on the guide rollers, flanges, drive belts, bearings, pulleys, reducing ball and
20 pin damage, extend machinery life and will result in an overall energy savings. It is another
21 observation of this inventor that the ball lift rods will no longer have to be manufactured
22 with a rubber coating to provide friction as the lead guide finger of this device captures
23 and holds the ball in a concave radius, applying a constant pressure against the back ball
24 lift rod. It is a further observation of this inventor that due to the ball retriever one piece
25 simplicity it could ultimately be incorporated into the manufactures fabrication of the ball
26 return wheel.

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1 SUMMARY OF THE INVENTION :

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3 The present invention is a one piece structure having no moving parts that when
4 secured to the ball return wheel captures, guides, lifts and deposits in one smooth continuous
5 flowing motion, a bowling ball for subsequent discharge into a bowling ball return.
6 This positive action device provides the integrity of a constant friction against a bowling
7 ball on its return path through automatic bowling machinery, it being impervious to
8 slippage caused by lubricants and drag caused by dust and dirt. This device eliminates the
9 need for disposable ball kickers and other ball return aids having moving parts and allows
10 the automatic machinery to be operated at a lower r.p.m. thereby extending machinery
11 lifetime and for a savings of energy.

12 It is an object of the invention to provide the user a device that reduces automatic
13 bowling machinery downtime and a subsequent loss of revenue by eliminating spinners
14 and ball hang-ups regardless of how much oil is on the ball.

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16 It is another object of the invention to provide the user a one piece device, having no
17 moving parts, that eliminates the need for disposable ball kickers and other ball return aids
18 having moveable components.

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20 It is a further object of the invention to provide the user a more environmentally
21 friendly device that eliminates the need for the disposal of oil soaked rubber ball kickers
22 and carpet strips into land fill areas.

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24 It is another object of the invention to provide the user safer operation of automatic
25 bowling machinery by eliminating a potential fire hazard posed by the presence of oil
26 saturated kicker strips.

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28 It is a further object of the invention to provide the user a device that reduces the
29 excessive wear on automatic bowling machinery such as bearings, guides, belts and drives
30 by allowing the user to operate the equipment at a lower r.p.m.

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32 It is another object of the invention to provide the user a more energy efficient
33 operating system by allowing them to operate at a lower r.p.m.

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1 It is a another object of the invention to provide the user a device that reduces
2 bowling ball and pin damage by allowing them to operate at a slower r.p.m.

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4 It is a further object of the invention to provide the user a device that helps speed
5 bowling pins on the rear of the pit conveyor into the pin elevator thereby reducing
6 the setup time of bowling pins.

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8 It is a further object of the invention to provide the user a device that eliminates
9 the expense and danger of using hazardous cleaning materials and eliminates the time
10 required by a mechanic to clean the ball return wheel.

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12 It is another object of the invention to provide the user a device that reduces mechanical
13 downtime thereby saving the expense of replacing expensive bearings on rollers and pulleys.

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15 It is a further object of the invention to provide the user a field upgrade kit to slow
16 down the automatic bowling machinery to facilitate smoother operation and provide longer
17 machinery lifetimes.

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19 Further objects are implicit in the detailed descriptions which follows hereinafter (which
20 is to be considered as exemplary of, but not specifically limiting, the present invention)
21 and said objects will be apparent to persons skilled in the art after a careful study of the
22 detailed descriptions which follows.

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24 For the purpose of clarifying the nature of the present invention , one exemplary
25 embodiment of the invention is illustrated in the hereinbelow-described figures of the
26 accompanying drawing and is described in detail hereinafter. It is to be taken as representative
27 of the multiple embodiments of the invention which lie within the scope of the invention.

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BRIEF DESCRIPTION OF THE DRAWINGS :

Fig. 1 is a perspective view showing one exemplary embodiment of one representative form of the invention.

Fig. 2 is a perspective view showing one exemplary embodiment of one representative form of the invention.

Fig. 3 is another perspective view showing one exemplary embodiment of one representative form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS :

Referring to Fig. 1. Bowling ball retriever 1 is a positive contact singularity base, that is to say, it is a one piece contact device having no moving parts. Ball retriever 1 is secured to the ball return wheel 6 with pop rivets 2, however other means of securing or fastening may also be used. The bottom 7 of ball retriever 1 is configured convex to physically comply with the inside radius of the ball return wheel 8, however that is not to say that another bottom configuration could be used if required by another form of fastening. The lead guide finger 9 of ball chaser 1 is designed to retrieve the ball, differentiating between ball and pin, to guide, capture and house the ball in its concave leading edge 10 for lift and delivery for subsequent discharge into a ball return. The ball, held in the radius of the lead guide finger 11 applies the correct amount of pressure against the back ball lift rod 12 eliminating the need for the rubber friction compensator. The leading edge 13 of ball retriever 1 is of a particular radius, however, other shapes or radii could also be used. The top trailing edge 14 of ball retriever 1 is of an angle for easy deposit of the ball into the ball return at the top of the ball lift, however another shape or angle could also be used. Ball retriever 1 eliminates the need for the manufacture to friction compensate the ball return system by operating at 36 r.p.m, this inventor suggests that the bowling machinery be now operated at a lower r.p.m. by using belt and pulley reduction, however, other means of speed reduction may also be used. Elongated front angled edge 3 expedites the separation of the bowling ball and bowling pins for a faster ball return system. The second angle top rear 4 facilitates easier discharge of bowling ball onto the ball return rails 15. Recess 5 secures the bowling ball for delivery to the ball return rails 15. Impact cushion 16 is attached to the impact side of ball retriever 1 with adhesives however that is not to say that other means of fastening may also be used, the function of impact cushion 16 is to assist in diverting the ball and to lesson the stress placed on the fasteners 2 used to attach the ball retriever device 1 to the ball return wheel 6. Ball protector lip 17 is shaped by the forming process of ball retriever 1, however other means of ball protection may also be used. One or more impact cushions (16) or other configurations and compositions may also be used however that is not to say that other means of bowling ball protection may also be used.

REFERENCE 1

1. Retriever
2. Pop rivets
3. Elongated front angled edge
4. Second angle top rear
5. Recess
6. Ball return wheel
7. Bottom
8. Inside radius of the ball return wheel
9. Lead guide finger
10. Concave leading edge
11. Radius of lead guide finger
12. Ball lift rod
13. Leading edge
14. Top trailing edge
15. Ball return rails
16. Ball impact cushion
17. Ball protector lip

REFERENCE 2

1. The bowling ball retriever 1, operating on Brunswick models A and A2
2. automatic pinsetters, is capable of operating at standard machine
3. speeds. However to enhance it's capabilities, we utilize and do recommend
4. using, a ball wheel speed reduction modification for Brunswick Models
5. A and A2 as described hereinafter. The standard Brunswick Models
6. A1 and A2 automatic pinsetter has been modified through a series of belt
7. And pulley ratio changes that allow the ball wheel 6 (Brunswick Ref.
8. # E142) to run approximately 1/3 of it's normal speed while keeping the
9. other Brunswick components running at or near their standard speeds.
10. Referring to Reference sheet 4 The speed reduction consists of the changing
11. Of the length of belt-jack shaft cross drive (Brunswick Ref. # E7) the
12. Diameter of sheave (Brunswick Ref. # E 41), the diameter of sheave
13. (Brunswick Ref. # E 40), the diameter of pulley assembly (Brunswick
14. Ref. # PC 17), the diameter sheave (Brunswick Ref. # PC 61), the length
15. Of ball wheel belt (Brunswick Ref. # E 6) and the diameter of sheave
16. (Brunswick Ref. # E 41).